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University of Washington

Abstract

SLEEP PATTERNS, SLEEP ADEQUACY, AND MEDICATION USE IN THE POSTPARTUM PERIOD

by Susan Elizabeth Grant, Major, United States Air Force

1988

Alterations in sleep of postpartum women are well documented phenomena. A group of 35 healthy postpartum women were studied using secondary analysis to describe two sleep parameters and medication use and to identify relationships among these variables. The descriptive data indicated the use of postpartum analgesia peaked on the first postpartum day. On the first postpartum night, 33 of the 35 subjects were observed to have at least one opportunity for sleep, and 24 of the 26 subjects on the second night were observed to have at least one opportunity. On all three self-reported measures of sleep adequacy, the number of subjects who described their sleep more favorably increased from the first night to the second. From the chi square analyses, those subjects who had two or more sleep cycle opportunities on the first night were those who had no labor analgesia or only short acting analgesia. No significant relationships existed among the types of intrapartum anesthesia and the sleep parameters. The subjects who had one or two sleep cycle opportunities during the last third of the second night were those who were medicated with central acting analgesia on the first day. No significant associations were found between medication use on the first day and sleep parameters of the first night and medication use on the second day and sleep parameters of the second night. The isolated relationships indicated no consistent patterns between medication use and the sleep parameters.

Sleep Patterns, Sleep Adequacy, and

Medication Use in the Postpartum Period

by

SUSAN ELIZABETH GRANT

A thesis submitted in partial fulfillment
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1988

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University of Washington

Abstract

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by Susan Elizabeth Grant

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CHAPTER I

INTRODUCTION

The birth of an infant represents both a beginning and an end in the lives of the emerging family. Ending is the pregnancy with all of the associated physiological and psychological changes. Ending also is the fantasy of the child (Rubin, 1984). Beginning is this new life as part of the extrauterine environment, involved in new relationships with each member of his family. For the postpartal woman, beginning is the time of the most intense physiological and psychological change, the process of healing and regeneration (Rubin, 1961). For this process to occur, the parturient must undergo a deep, refreshing sleep (Rubin, 1961). And when her need for sleep has been satisfied, the parturient "...awakens with a wellspring of trust and faith" (Rubin, 1961, p. 752). If this postpartal sleep is disturbed, however, the regenerative process is delayed, and the parturient experiences "...what can be best described as sleep-hunger for several days" (Rubin, 1961, p. 753).

Researchers have identified alterations in the sleep patterns of women throughout the perinatal cycle (Branchey & Petre-Quadens, 1968; Karacan, Heine, Agnew, Williams, Webb, & Ross, 1968; Karacan, Williams, Hursch, McCaulley, & Heine, 1969; Schweiger, 1972). Using electronic monitoring techniques in the clinical setting, researchers have documented profound changes in the sleep physiology during the puerperium (Branchey & Petre-Quadens, 1968; Karacan et al., 1968; Karacan et al., 1969). Self report data from postnatal clients also

has indicated the presence of altered sleep patterns (Schweiger, 1972; Gruis, 1977; Harrison & Hicks, 1983; Killien & Lentz, 1985; Campbell, 1986; Keefe, 1988). And when asked to list postpartum concerns, postnatal clients have consistently ranked altered sleep patterns among their top five (Gruis, 1977; Harrison & Hicks, 1983; S. Blackburn, S. Tribotti, J. Withers, N. Lyons, & M. Stein, personal communication, October 9, 1987). The factors most frequently reported as contributing to these sleep alterations included: physical discomforts (Karacan et al., 1968; Karacan et al., 1969; Schweiger, 1972), the presence of the infant (Schweiger, 1972; Killien & Lentz, 1985; Campbell, 1986), and nursing care activities (Killien & Lentz, 1985). And for all of these factors that contribute to sleep alterations, nursing interventions are appropriate.

Nursing plays a vital role in supporting an environment conducive to sleep. In the medical and surgical care settings, nursing interventions traditionally focus on physical comfort measures such as relief from hunger, thirst, and pain, and the provision of a clean, dry, temperate, and quiet environment (Zelechowski, 1977; Stead, 1985; Goodemote, 1985). Psychological interventions to enhance sleep such as expression of feelings and concerns and relief from anxiety are also common nursing practices on medical and surgical units (Zelechowski, 1977; Goodemote, 1985). However, there are few descriptions in the literature about the perinatal nurse's interventions when she is faced with the postpartum client's changing sleep patterns. One traditional nursing intervention aimed at the perinatal client's changing sleep patterns is the administration of

analgesic and and sedative medications. However, there are few descriptions in the literature detailing the frequency of analgesic and sedative use among postpartum clients and how those medications subsequently affect both the quality and quantity of postpartum sleep. Because of these discrepancies in the nursing literature relating medication administration to effects on postpartum sleep, this relationship was studied.

Review of Literature

Sleep

It is generally acknowledged that sleep is an integral part of the rhythm of our daily lives and is a basic physiological need (Carter, 1985). Sleep, itself, can be divided into two main phases: rapid eye movement (REM) sleep, during which dreaming occurs, and non-rapid eye movement (NREM) sleep. NREM sleep is further divided into four stages, NREM Stages I, II, III, and IV. Stage I, sleep latency, is the transition between wakefulness and the sleep state. Individuals are easily awakened and may subjectively report that they are still awake. Stage II follows and is the first clearly defined stage of sleep. Stages III and IV, also referred to as delta sleep, are progressively deeper levels of sleep. It is difficult to awaken an individual from these stages of sleep since it is the deepest sleep of the night. During one cycle of sleep, an individual progresses through the NREM and REM stages in approximately ninety minutes. This cycle is then repeated approximately five times in an eight hour period of time.

The exact purpose of sleep is unknown (Hartmann, 1970). Sleep researchers agree that sleep has a restorative function with NREM sleep, especially Stages III and IV, being necessary for basic biological processes such as tissue repair, recovery from fatigue, and growth (Kleitman, 1963; Oswald, 1972; Hartmann, 1973; Adam & Oswald, 1983). The role of REM sleep, or frequently referred to as paradoxical sleep, is unclear; however, it has been linked with synthetic and restorative functions in the brain (Hartmann, 1973) and the psychological importance of dreams (Dement, 1960; Sampson, 1966).

How much sleep is required for optimal function is also not clearly defined by sleep researchers. It appears that the sleep requirements of individuals vary widely and that for each individual there is an optimum amount of sleep (Dement, 1972). Hartmann (1970) believes that people subjectively have the impression of needing sleep and that adequate sleep supplies this subjective feeling of being rested. Hartmann (1970) also believes that sleep serves to optimize both physical and psychological functioning. The subjective feeling of whether or not an individual has had a good night sleep is dependent not only on the length of time the individual sleeps but also on the number of times he wakes during the night (Hartmann, 1970). An hour's extra wakefulness is compensated for by additional amounts of highly restorative NREM sleep and human growth hormone (Beck, Brezinova, Hunter, & Oswald, 1975). Thus, both quality and quantity are important in understanding sleep adequacy.

Pregnancy and Sleep

Nonpregnant sleep standards cannot be applied to the study of phenomena observed in pregnancy (Branchey & Petre-Quadens, 1968). Using the physiological parameters of electroencephalogram, electromyography, and eye movements, Branchey and Petre-Quadens (1968) studied seventeen pregnant clients between ten and forty weeks gestation on one to three consecutive nights. Their recordings indicated an increase in REM sleep beginning from the 25th week, peaking during 33 to 36 weeks, decreasing in the three to four weeks preceding the birth, and returning to normal by the end of pregnancy. In the classic study of sleep during pregnancy, Karacan, Heine, Agnew, Williams, Webb, and Ross (1968) investigated sleep patterns during uncomplicated late pregnancy and the puerperium. Their data indicated that their subjects displayed profound sleep changes which tended to normalize within two weeks postpartum. Stage I, sleep latency, was longer before and immediately following birth than that observed in the control subjects. There was a 100% Stage IV reduction in four of seven subjects during late pregnancy. All seven subjects showed an increase in Stage IV beginning on the first postpartum night and reaching normal levels by the second postpartum week. The percentage of REM throughout pregnancy was comparable to controls except on the first postpartum night when there was a sharp rise in awake time and a decrease in REM. By the third postpartum night, this pattern was reversed with a decrease in awake time and an increase in REM and approached nonpregnant normal levels by the second postpartum week. During pregnancy and immediately postpartum, there were also

significantly more awakenings for the subjects than for controls. The subjects also spent less total time asleep than controls.

In 1972, Schweiger set out to determine whether sleep was altered during pregnancy and when it was altered from the client's perspective. He did not base his research on physiological data as Branchey and Petre-Quadens (1968) and Karacan et al. (1968) and Karacan et al. (1969) had, but rather used a subjective survey of 100 randomly selected clients at least 38 weeks gestation. His results indicated that 69% believed their sleep to be altered, 50% believing they had less than normal sleep. The number of clients believing their sleep to be altered increased during each trimester, with the fewest hours of reported sleep occurring in the third trimester.

Also using self report data but in conjunction with observational data, Killien and Lentz (1985) set out to describe sleep patterns and satisfaction in the natural postpartum setting, the hospital. Without the use of electronic monitoring techniques, these authors gathered data from forty healthy women during the first 48 hours postpartum using the clients' records, structured interviews, and direct observations of sleep. Their results indicated the subjects were awake 12-69% of the direct observations, with the mean number of awake times slightly higher in the first half of the night. Despite frequent awakenings, morning evaluations were positive, with 67% of the subjects describing the previous night sleep as good or excellent. Over 80% felt rested.

Keefe (1988) also used self report data during her study concerning the influence of newborn rooming-in on maternal sleep at

night. She studied two groups of mother-infant dyads, one group with infants rooming-in at night and one group with infants in the nursery during the night. In the morning after each night of sleep, her subjects estimated the total number of hours they slept and rated the quality of that sleep. The results indicated that the rooming-in group slept an average of 5.55 hours during the eight hour period. The mothers whose infants were in the nursery slept slightly less, 5.35 hours. Mothers in the rooming-in group also reported a slightly higher quality of sleep as compared with the mothers whose newborn infants slept in the nursery. Both of these differences, however, were not statistically significant. In examining medication administration data, Keefe found that seven of the ten mothers in the nursery group had taken sleep medication, while none in the rooming-in group had taken sleep medication. Overall, regardless of the group assignment, Keefe found the majority of mothers were not satisfied with both the amount and the quality of sleep they received in the hospital.

From these and other studies on sleep during pregnancy and the postpartum period, certain factors consistently emerged as influencing maternal sleep patterns. Karacan et al. (1968) and Karacan et al. (1969) found the number of awakenings were distributed evenly throughout the night with the need to urinate and episiotomy discomfort the major reasons for waking. Schweiger (1972) found urinary frequency, heartburn, general discomfort, cramping, shortness of breath, and the presence of other children to be the causes of disturbed sleep. Killien and Lentz (1985) identified roommate

activity, the baby present for feeding, and routine nursing care measures interfered most with sleep. In Campbell's 1986 descriptive study of the sleep patterns of mother-infant dyads, she found frequent interruptions in sleep to be caused by the unpredictable sleep-wake patterns of the newborns. For the majority of these identified factors that impacted the quality and quantity of sleep, nursing intervention is appropriate.

Nursing Intervention

One nursing intervention toward improving sleep in the perinatal period is through the administration of analgesic and sedative medications. The majority of research, however, linking the administration of analgesic and sedative medications to improvements in sleep has studied only nonpregnant clients. Even though it is unclear how this research translates to the perinatal client, these medications are not without certain side effects on the physiology of sleep.

Analgesia. Narcotics are the most widely used systemic medication to reduce pain during the first stage of labor (Kryc & Rayburn, 1982). Several narcotic analgesics are available for use throughout the perinatal cycle, but their pharmacologic properties and observed effects are similar (Kryc & Rayburn, 1982). In 1969, Kay, Eisenstein, and Jasinski studied the effects of singles doses of morphine sulfate on the physiologic parameters of nonpregnant human sleep as measured by the electroencephalogram. They identified the following effects of morphine sulfate on sleep: an increase in sleep

latency, decreases in NREM Stages III and IV, an increase in the time required to attain REM sleep (REM latency), and a decrease in the total amount of REM sleep. The researchers also observed increases in body movements, wakefulness, and drowsiness and a decrease in the total amount of sleep. Morphine sulfate, the authors postulated, initially functioned as a stimulant.

In studies of chronic morphine sulfate administration, Kay (1975) observed decreases in drowsiness, sleep latency, and the total amount of REM sleep. He witnessed an increase in NREM Stage III sleep and REM latency but saw no significant changes in NREM Stages II and IV.

<u>Sedative-hypnotics</u>. Barbiturates are frequently administered to perinatal clients throughout the prenatal period and the early stage of labor to enhance sleep (Kryc & Rayburn, 1982). These medications, however, effect nonpregnant human sleep physiology in a number of ways. With single doses of the barbiturate, secobarbital, wakefulness is decreased (Edsjo & Dureman, 1968). Sleep latency is also decreased (Williams, 1954; Edsjo & Dureman, 1968; Allnutt & O'Connor, 1971). Total sleep time is increased through an increase in NREM Stage II sleep (Lester, Coulter, Cowden, & Williams, 1968; Allnutt & O'Connor, 1971). Yet, the average duration of each REM episode is decreased (Lehmann & Ban, 1968; Lester et al., 1968; Feinberg, Hibi, Cavness, & March, 1974).

<u>Hypnotics</u>. Single doses of short-term uses of the common benzodiazapine, flurazepam, are also indicated for women during the perinatal cycle to combat sleeplessness (Votolato & Pariser, 1982).

Flurazepam alters nonpregnant human sleep physiology in several ways. Wakefulness is decreased by doses as small as fifteen milligrams (Kales, Allen, Scharf, & Kales, 1970). Sleep latency is decreased (Kales et al., 1970; Dement, Zarcone, Hoddes, Smythe, & Carskadon, 1973; Fujii, 1973). NREM Stage II sleep is increased (Kales et al., 1970; Fujii, 1973; Johns & Masterton, 1974). NREM sleep Stages III and IV are decreased with flurazepam (Kales et al., 1970; Kales, Kales, Scharf, & Tan, 1970; Dement et al., 1973; Fujii, 1973). REM sleep is depressed (Kales et al., 1970; Dement et al., 1973; Fujii, 1973). Flurazepam also decreases the total number of awakenings throughout the sleep episode (Dement et al., 1973; Johns & Masterton, 1974). The overall amount of sleep time is increased (Hartmann, 1968; Dement et al., 1973; Johns & Masterton, 1974).

Chronic use of flurazepam also has physiological effects on sleep. NREM Stage II sleep is increased and Stage IV is decreased (Kales, Kales, Bixler, & Scharf, 1975; Feinberg, Fein, Walker, Price, Floyd, & March, 1977). For both groups of authors, total sleep is increased. They postulate the longer periods of less intense Stage II sleep might produce biological effects equal to those of a shorter period of more intense Stage IV sleep.

Two other groups of sleep researchers observed for other effects of flurazepam usage. The first group, Johnson, Church, Seales, and Rossiter (1979) examined the auditory arousal thresholds of good and poor nonpregnant sleepers. Flurazepam administered to light sleepers increased their auditory threshold but only during the drug's peak effect, one to two hours post-ingestion. The return to sleep was

significantly longer for poor sleepers after arousal during the night's first NREM Stage II and IV episodes. With subsequent arousals, there was no significant differences. The second research group, Church and Johnson (1979), studied whether repeated use of flurazepam affected the subjective state and performance of motor, cognitive, and short-term memory in a group of poor, nonpregnant sleepers. The medication did not impair mood or short-term memory but did impair cognitive and motor performance. These authors suggested that the repeated use of flurazepam may have a cumulative effect on motor behavior.

There is little research in the literature describing medication use and their effects among perinatal clients. Woodward, Brackbill, McManus, Doering, and Robinson (1982) investigated the effects of medication on intrapartum clients but did not measure the effects on their subjects' sleep. It is evident that further study is indicated to identify specific relationships between the use of medications and the effects on perinatal sleep patterns.

In summary, sleep is an integral part of our daily lives. Even though the exact purpose is unknown, sleep is believed to influence both physiological and cognitive functions. Using physiologic monitoring and self-report data, sleep researchers have identified alterations in the sleep process throughout most of pregnancy and the postpartum period. To combat these sleep alterations in the postpartum period, analgesic and sedative medications are frequently used. However, these medications produce alterations in the physiologic mechanisms of sleep. If nursing understood more about the

interactions of medications and sleep during the postpartum period, they could utilize this information to guide nursing interventions. Therefore, the purpose of this study will be to explore the relationship of medication use and sleep in the postpartum period.

Purpose of Study

The purpose of this study was to examine the relationships between medication use during the intrapartum and postpartum periods and postpartum sleep patterns and reported sleep adequacy. Specific aims were to:

1. describe the types of medications administered to intrapartum and postpartum clients

2. describe the frequency of use of those medications to intrapartum and postpartum clients

3. describe the clients' sleep patterns and reported sleep adequacy on the first and second postpartum nights

4. examine the relationship between the use of intrapartum analgesic medications and the clients' sleep patterns and reported sleep adequacy on the first and second postpartum days

5. examine the relationship between the use of intrapartum anesthetic medications and the clients' sleep patterns and reported sleep adequacy on the first and second postpartum days

6. examine the relationship between the use of postpartum analgesic and sedative-hypnotic medications and the clients' sleep patterns and reported sleep adequacy on the first and second postpartum days.

Description of Major Concepts

The major concepts studied included:

postpartum period - the time following the third stage of labor and lasting four to six weeks during which repair of injury to the birth canal, involution of the uterus, and return of all body systems to the nonpregnant state occurred. It was also referred to as the puerperium or the postnatal period. For this study, the postpartum period was considered the first two days following birth.

medication - a substance or preparation used in treating a disease or something other than a disease.

analgesic medication - a substance that produced insensibility to pain without the loss of consciousness. Analgesic medications were divided into two groups: central nervous system acting and peripheral acting medications. Centrally acting analgesia was a substance which inhibited the perception of pain and altered the psychological reaction associated with pain perception. Peripherally acting analgesia was a substance that produced insensibility to pain by affecting the peripheral pain receptors.

anesthetic medication - a substance that produced loss of sensation or feeling with or without the loss of consciousness.

hypnotic medication - a substance that induced sleep.

sedative-hypnotic medication - a substance that calmed nervousness, irritability, and excitement and induced sleep.

sleep - a natural or artifically induced state of suspension of sensory and motor activity.

sleep pattern - the number of observed 90 minute sleep cycle

opportunities.

sleep adequacy - the degree to which the client perceived her need for sleep was fulfilled regardless of the amount. Three indicators of sleep adequacy included the subjects' ratings of satisfaction with the night's sleep, the degree of rest perceived after sleep, and how sound was the night's sleep.

CHAPTER II

METHODOLOGY

This study was both descriptive and correlational using secondary analysis of the data collected by Killien and Lentz (1985) in a study of the sleep patterns oi hospitalized postpartum women.

Sample and Setting

The sample consisted of the 35 women from the original study by Killien and Lentz (1985). Participants were recruited from the postpartum units of the University of Washington Hospital and Swedish Hospital Medical Center, Seattle, Washington. Data from both inpatient units were used to increase the possibility of obtaining variation in subject characteristics and hospital environment. Originally, a sample size of forty was sought for the primary study (Killien & Lentz, 1985) because, as determined through the use of power analysis (Cohen, 1977), this would have allowed a 2/3 chance of detecting a correlation of 0.30 among variables at a 0.05 significance level using a two-tailed test. The sample size of forty was also judged to be realistic in relation to the availability of subjects for recruitment and data collection methods. A sample of only 35 was obtained in the primary study; however, this sample size should provide reasonable power for detecting correlations at the above level.

The subjects who were selected for the study met the following criteria: vaginal birth, were eighteen years of age or older, required no intravenous therapy or indwelling urinary catheter after

eight hours postbirth, and whose infant was alive and admitted to the normal newborn nursery. Women who met these criteria were approached by an intermediary to determine if they would be willing to talk with an investigator about the study. Those women who agreed to participate signed a consent form and, thus, composed the sample. University of Washington Human Subjects Review Committee approval was obtained by the original investigators prior to approaching potential subjects.

Instrumentation

In the original study (Killien & Lentz, 1985), data were gathered by review of the clients' records, interview, and direct observation of two night's sleep. Clients' records were used to obtain data about subjects' ages, gravida, parity, vital signs, antepartum and intrapartum risk scores, labor and birth characteristics, use of medication, newborn weights and gestational ages, and the method of infant feeding. A structured interview was conducted following each night of sleep observation to document perceptions of sleep. The sleep pattern was determined by trained observers making observations at fifteen minute intervals during the first and second postpartum nights. Because the subjects were found to be proficient at making accurate estimates of sleep latencies and awakenings when compared with electroencephalogram recordings (Webb, Campbell, & Hendlin, 1980; Campbell & Webb, 1981), the estimates of sleep in the original study were considered adequate for its purposes. These estimates were also considered adequate for this secondary analysis.

The variables of interest in this study were operationalized using three of the original study's instruments. The administration of analgesic, anesthetic, and sedative-hypnotic medications were identified using the clients' medical records (see Appendix A). Sleep adequacy was determined from three questions asked in the postpartum interviews following the first and second postpartum nights. These questions required the subjects to rate the quality of sleep, to describe how rested they felt after the night's sleep, and to describe how soundly they slept (see Appendix B). The sleep pattern was determined using the sleep observation guide (see Appendix C). If a subject was judged to be asleep during six consecutive, 15 minute intervals, the subject had the opportunity to complete one sleep cycle. This 90 minute opportunity for sleep was considered a sleep cycle opportunity; the total number of observed 90 minute sleep cycle opportunities was the subject's sleep pattern.

Reliability and Validity

Since no instruments were found suitable for the original study, the interview guides and the sleep observation record were developed by the original investigator. The instruments were pretested for clarity and content validity. The sleep observation record was also pretested for meaningfulness of the observation categories and to determine the number of reliable observations that were made under the study's conditions. To achieve interrater reliability, the study's observers made observations together until they reached a 0.99 correlation. The observers reestablished interrater reliability

during each night of data collection by making one simultaneous observation of sleep.

The medical record data describing the administration of analgesics and sedatives may have been incomplete. However, the documentation requirements for these medications as outlined by each hospital's medication administration policy may have increased the reliability and validity of the medication data.

Procedure

The data for this study were extracted from the existing computer coded data files from the original study (Killien & Lentz, 1985). Recoding of the postpartum medication data was accomplished to facilitate interpretation. Each of the medications administered in the postpartum period was reassigned to one of the four following categories: nonsedative, nonanalgesic medication; central acting analgesia; peripheral acting analgesia; or sedative-hypnotics. Sedative and hypnotic medications were grouped into one category due to the small number of doses of each given throughout the entire study period. The use of postpartum medications was defined as the number of doses in one specific category as listed above received on either the first or second postpartum day. The relationships between the postpartum medications and the sleep parameters were examined using chi-square.

CHAPTER III

RESULTS

Data were analyzed using both descriptive and correlational statistics. The sample, use of intrapartum and postpartum medications, sleep patterns, and sleep adequacy were described using frequency distributions and measures of central tendency. Relationships between intrapartum and postpartum medication use and the sleep parameters were examined using the nonparametric test, chi-square.

Sample Description

The 35 women who comprised the sample were described according to the physical characteristics of age, gravida, and parity status (Table 1). Age ranged from 18 to 42 years, with a mean age of 26.9 years. The modal age was 33. Gravida status ranged from 1 to 6, with 12 subjects having the modal gravida of 2. Parity ranged from 1 to 5, with 18 subjects having the modal parity of 1. Along with these physical characteristics, the subjects were also described using labor and birth characteristics.

Descriptions of the subjects' labor and birth included the length of the first three stages of the labor process and the total length of labor (Table 2). The length of the first labor stage ranged from 2 hours, 40 minutes to 46 hours, 12 minutes. The mean length of this first stage was 13 hours, 33 minutes. The length of the second stage of labor ranged from 4 minutes to 3 hours, 11 minutes. The mean length of this stage was 60.24 minutes. Stage three labor ranged in

Table 1

Sample Characteristics

Characteristic	n	%
Age		
18-20	4	11.4
21-25	11	31.4
26-30	9	25.7
31-35	9	25.7
36-42	1	2.9
missing	1	2.9
Gravida		
1	8	22.9
2	12	34.2
3-6	14	40.0
missing	1	2.9
Parity		
0	0	0
1-2	28	80.0
3-5	6	17.1
missing	1	2.9

Table 2

Birth Characteristics: Length of Labor

Stage (in minutes)	n	%
One		
0-300	6	17.1
301-600	7	20.0
601-900	9	25.7
901-1200	6	17.1
1201-1500	2	5.7
1501-2772	3	8.6
missing	2	5.7
Two		
0-30	13	37.1
31-60	8	22.9
61-90	4	11.4
91-120	0	0
121-150	5	14.3
151-191	3	8.6
missing	2	5.7
Three		
0-5	18	51.4
6-10	9	25.7
11-15	1	2.9
16-20	1	2.9
21-30	1	2.9
31-190	2	5.7
missing	3	8.6
Total length of labor		
0-300	5	14.3
301-600	5	14.3
601-900	10	28.6
901-1200	4	11.4
1201-1500	3	8.6
1501-1800	3	8.6
1801-2835	2	5.7
missing	3	8.6

length from 1 minute to 3 hours, 10 minutes. The mean length of this stage was 13.18 minutes. The total length of labor ranged from 88 minutes to 47 hours, 15 minutes. The mean length of total labor was 14 hours, 47 minutes. Besides these quantitative characteristics of labor and birth, the type of birth was also used to describe the sample.

Only subjects who underwent vaginal birth were included in this study (Table 3). The majority (n=27) gave birth spontaneously, without the aid of forceps or the vacuum extraction technique. A total of six subjects had an assisted vaginal birth with the application of forceps. No subjects required the use of the vacuum extraction technique alone; however, one subject required both forceps application and vacuum extraction to give birth vaginally. During labor and the birth process, the subjects used a wide range of medications.

Table 3

Birth Characteristics: Types of Vaginal Birth

Type	n	%
Spontaneous	27	77.1
Forceps application	6	17.1
Vacuum extraction	0	0
Forceps application and vacuum extraction	1	2.9
Not recorded	1	2.9

Use of Intrapartum Medications

Analgesia

Intrapartum analgesia used is listed in Table 4. A total of seven subjects received the short acting, narcotic analgesic, alphaprodine hydrochloride during labor. The longer acting, narcotic analgesic, meperidine hydrochloride, was administered to two subjects; and one subject received morphine sulfate. Combinations of narcotic analgesics and antianxiety medications were also administered to the subjects during labor. Only one subject received both morphine sulfate and hydroxyzine hydrochloride, and one subject received both morphine sulfate and alphaprodine hydrochloride. A total of 21 subjects received no analgesia during the labor process; however, other comfort promoting interventions were used by the subjects.

Anesthesia

Three types of intrapartum anesthesia were used either singly or in combination by the participants in the study (Table 5). Local and/or pudendal anesthesia for the episiotomy was administered to 10 subjects. Regional anesthesia included paracervical block, epidural, caudal, or spinal block; and 13 subjects received one of these four options. General anesthesia was used by only one subject. Of the subjects who received a combination of anesthesia, three coupled local with regional anesthesia. One subject used both local and general anesthesia. Along with analgesic and anesthetic medication use, one other medication was widely used among the subjects.

Table 4

Intrapartum Analgesic Use

Medication	Number of Subjects	Percent
None	21	60.0
Alphaprodine hydrochloride	7	20.0
Meperidine hydrochloride	2	5.7
Morphine sulfate	1	2.9
Morphine sulfate and Hydroxyzine hydrochloride	1	2.9
Morphine sulfate and Alphaprodine hydrochloride	1	2.9
Not recorded	2	5.7

Table 5

Intrapartum Anesthetic Use

Type	Number of Subjects	Percent
None	5	14.3
Local and/or pudendal	10	28.6
Regional	13	37.1
General	1	2.9
Local and regional	3	8.6
Local and general	1	2.9
Not recorded	2	5.7

Uterine Muscle Stimulants

The use of the uterine muscle stimulant, oxytocin, during the labor process was also recorded for this sample. Of the 35 participants, 13 received oxytocin for the induction or augmentation of their labor.

Use of Postpartum Medications

A wide range of medications was administered to the subjects throughout their postpartum hospitalization. The categories of these medications included: central nervous system and peripheral acting analgesics, hypnotics, sedatives, antibiotics, uterine muscle stimulants, stool softeners and laxatives, vitamin supplements, central nervous system depressants, antidiabetic agents, anticoagulants, antiasthmatic agents, a prolactin inhibitor, and an anti-isoimmunization agent. Only central nervous system and peripheral acting analgesics, hypnotics, and sedatives given during the postpartum period were considered for further description because these medications were most likely to effect sleep.

Analgesics and sedative-hypnotics represented 47% of the total number of doses of all medications administered to the subjects throughout the duration of the postpartum study period, which was from birth through the second postpartum day. One half of all doses of medication received on the first and second postpartum days were analgesics and sedative-hypnotics (Table 6). Thirteen different analgesics and sedative-hypnotics were administered to the study sample (Table 7). However, three analgesics were administered most

Table 6

Comparison of Analgesics and Sedative-Hypnotics with Other Postpartum Medications

Type of Medication	Total Number of Doses Given Per Day: Delivery day n=35	1 n=35	2 n=26
Analgesia and sedative-hypnotics	43	61	21
All other medications	56	61	22
Total	99	122	43

Table 7

Postpartum Medication Use

Type of Medication	Total Number of Doses Given Each Postpartum Day		
	Delivery day n=35	1 n=35	2 n=26
Central acting analgesia			
Meperidine hydrochloride	1	3	1
Morphine sulfate	3	0	2
Hydromorphone hydrochloride	2	3	0
Codeine sulfate	3	7	0
Codeine sulfate/acetominophen	4	5	1
Oxycodone/acetominophen	1	2	0
Oxycodone/ASA	12	12	7
Propoxyphene napsylate with acetominophen	1	1	0
Ibuprofen	6	11	8
Proquazone[a]	1	0	0
Peripheral acting analgesia			
Acetominophen	6	15	2
Sedative-Hypnotics			
Diazepam	1	0	0
Flurazepam hydrochloride	2	2	0

[a]Proquazone was similar in actions to ibuprofen and was undergoing clinical trial during the primary study.

frequently, representing 64% of the total number of analgesic and sedative-hypnotic doses. The most frequently administered analgesic, oxycodone plus acetylsalicylic acid, represented 25% of the total number of analgesic and sedative-hypnotic doses; ibuprofen accounted for 20%; acetominophen represented 19%. Each of the remaining analgesics and sedative-hypnotics accounted for less than 8% of the total number of doses. The use of sedative-hypnotic medications was infrequent and represented only 4% of the total number of analgesic and sedative-hypnotic doses. For the sample as a whole, the use of analgesics peaked on the first postpartum day, with the exception of morphine sulfate, oxycodone with acetylsalicylic acid, propoxyphene napsylate with acetominophen, and proquazone.

Postpartum Sleep Patterns and Sleep Adequacy

The first parameter used in this study to describe postpartum sleep was the sleep pattern, or the number of observed opportunities for a 90 minute sleep cycle (Table 8). For the purpose of analysis, each postpartum night was divided into thirds to prevent redundancy in counting the number of sleep cycle opportunities. On the first postpartum night, 33 of the 35 subjects had at least one sleep cycle opportunity during the entire night. When the night was divided into thirds, 25 had at least one opportunity in the first third; and 22 had at least one opportunity during the last third. On the second postpartum night, 24 of the 26 subjects had at least one opportunity for sleep throughout the entire night. And again when the night was divided into thirds, 15 had at least one opportunity in the first

Table 8

Sleep Patterns: Sleep Cycle Opportunities

Number of Opportunities	Postpartum Night 1 n	Postpartum Night 1 %	Postpartum Night 2 n	Postpartum Night 2 %
First third of the night				
0	10	28.6	11	31.4
1	23	65.7	12	34.3
2	2	5.7	3	8.6
missing	0	0	9	25.7
Last third of the night				
0	13	37.1	10	28.6
1	15	42.9	11	31.4
2	7	20.0	5	14.3
missing	0	0	9	25.7
Total for the entire night				
0	2	5.7	2	5.7
1	10	28.6	7	20.0
2	10	28.6	8	22.9
3	10	28.6	8	22.9
4	2	5.7	1	2.9
5	1	2.9	0	0
missing	0	0	9	25.7

third; and 16 had at least one opportunity during the last third. The other parameter used to study postpartum sleep was sleep adequacy.

Sleep adequacy was also used as a measure of postpartum sleep and consisted of three self-reported characteristics of the previous night's sleep (Table 9). The first characteristic of sleep adequacy was the overall rating of the night's sleep. After the first postpartum night, 12 of the 35 subjects rated their sleep as poor or fair. The second characteristic of sleep adequacy was the degree to which subjects felt rested in the morning following the night of sleep. For the 35 subjects on the first postpartum night, 9 reported not feeling rested or only somewhat rested. After the second postpartum night, 4 of the 26 subjects reported the same characteristics. The third characteristic of sleep adequacy described the soundness of the previous night's sleep. For the 35 subjects after the first night, 7 reported very unsound sleep or somewhat unsound sleep. For the 26 subjects on the second postpartum night, 6 reported the same. From these results describing the sample, the use of intrapartum and postpartum medication, and postpartum sleep, certain relationships among the variables were established by means of correlational techniques.

Intrapartum Analgesia and Sleep Parameters

The relationship between intrapartum analgesia and the sleep parameters were examined using the nonparametric test, chi-square. For these analyses, the long acting narcotic analgesics, morphine sulfate and meperidine hydrochloride, were grouped together into one

Table 9

Three Characteristics of Sleep Adequacy

Characteristic	Postpartum Night 1 n	Postpartum Night 1 %	Postpartum Night 2 n	Postpartum Night 2 %
Overall rating of sleep				
poor	5	14.3	4	11.4
fair	7	20.0	4	11.4
good	17	48.6	12	34.3
excellent	4	11.4	6	17.1
missing	2	5.8	9	25.8
Degree of rest				
not rested	2	5.7	1	2.9
somewhat unrested	7	20.0	3	8.6
somewhat rested	20	57.1	17	48.6
very rested	4	11.4	5	14.3
missing	2	5.8	9	25.8
Soundness of sleep				
very unsound	2	5.7	2	5.7
somewhat unsound	5	14.3	4	11.4
somewhat sound	15	42.9	4	11.4
very sound	11	31.4	16	45.7
missing	2	5.8	9	25.8

category. The short acting narcotic analgesic, alphaprodine hydrochloride, was included in a separate category. If a subject received short acting analgesia or antianxiety medication along with long acting analgesia, these combinations were grouped with the long acting analgesics. This grouping of medications was accomplished because so few doses of each medication or combination were given to the subjects.

The type of intrapartum analgesia administered to the subjects was associated with the sleep pattern, or the number of observed 90 minute sleep cycle opportunities, on the first postpartum night [$x^2(15)=30.44$, $p < .05$] (Table 10).

Table 10

Relationship Between Type of Labor Analgesia and Sleep Cycle Opportunities on the First Postpartum Night

Number of Subjects Receiving Medication	Total Sleep Cycle Opportunities 0	1	2	3	4	5
No medication	0	8	9	3	0	1
Short acting analgesia	0	0	1	5	1	0
Long acting analgesia	2	1	0	2	0	0
Missing	0	1	0	0	0	0

[$x^2(15)=30.44$, $p < .05$] n=34

For the 22 subjects who had two or more opportunities for sleep throughout the entire first postpartum night, 13 received no analgesia; 7 received short acting analgesia; and 2 received long acting analgesia. For the 12 subjects who had zero or one opportunity for sleep throughout the first postpartum night, 8 received no labor analgesia; 3 received long acting analgesia; and one subject's labor analgesia was not recorded. Both the type of analgesia and the observational sleep data were not available for one subject. The type of intrapartum analgesia was not associated with any of the other sleep parameters.

No relationships were found between labor analgesia and the remaining first postpartum night sleep parameters, which included the overall rating of sleep, the degree of rest, soundness of sleep, and the sleep cycle opportunities during the first and last thirds of the first night. No associations were discovered between labor analgesia and the three measures of sleep adequacy and the observed sleep patterns from the second postpartum night.

Intrapartum Anesthesia and Sleep Parameters

No significant relationships existed among the types of intrapartum anesthesia and the overall rating of sleep, the degree of rest, the soundness of sleep, and the observed sleep cycle opportunities on either the first or second postpartum nights.

Postpartum Medication and Sleep Parameters

First Postpartum Night

Examining the relationship between the overall rating of sleep, degree of rest, soundness of sleep and the observed sleep cycle opportunities on the first postpartum night and the number of doses of analgesic and sedative-hypnotic medications taken on the first day, no significant associations were discovered (Tables 11-13).

Second Postpartum Night

Examining the relationship between the observed sleep cycle opportunities and postpartum medication, one pattern of medication use on the first postpartum day was significantly associated with observed sleep on the second postpartum night. The subjects who had one or two sleep cycle opportunities during the last third of the second night were those who were medicated with central acting analgesia on the first postpartum day [$x^2(6)=13.76$, $p < .05$] (Table 14). A total of 26 subjects received central acting analgesia on the first day and were observed on the second night. For the 16 subjects who had one or two opportunities for sleep during the last third of the second night, 3 received no central acting analgesia; 7 received one dose; 2 received two doses; and 4 received three or more doses. For the 10 who had no opportunity for sleep during the same period, 6 received no doses of central acting analgesia; 2 received one dose; and 2 received three or more doses. No other relationships were found between the number of doses of central acting analgesia taken on the first day and the overall rating of sleep, the degree of rest, soundness of sleep, and

Table 11

First Postpartum Day Central Acting Analgesia and First Night Sleep

Sleep Parameter	Number of Doses 0	1	2	3-6
Overall rating				
Poor	2	2	0	1
Fair	4	2	0	1
Good	6	5	1	5
Excellent	2	1	1	1
[$x^2(9)=5.47$, ns]				
Degree of rest				
Not rested	0	1	0	1
Somewhat unrested	2	2	1	2
Somewhat rested	10	6	0	4
Very rested	2	1	1	0
[$x^2(9)=8.10$, ns]				
Soundness of sleep				
Very unsound	0	1	0	1
Somewhat unsound	3	1	1	0
Somewhat sound	5	5	0	5
Very sound	6	3	1	1
[$x^2(9)=8.84$, ns]				
Total sleep cycle opportunities				
0	1	0	0	1
1	5	3	1	1
2	4	4	0	2
3	4	2	1	3
4	1	1	0	0
5	1	0	0	0
[$x^2(15)=6.74$, ns]				
Sleep cycle opportunities: First third				
0	5	2	1	2
1	9	8	1	5
2	2	0	0	0
[$x^2(6)=3.63$, ns]				

(table continues)

Sleep Parameter	Number of Doses 0	1	2	3-6
Sleep cycle opportunities:				
Last third				
0	5	3	1	4
1	6	6	1	2
2	5	1	0	1
[$x^2(6)=4.31$, ns]				

Table 12

First Postpartum Day Peripheral Acting Analgesia

and First Night Sleep

Sleep Parameter	Number of Doses 0	1	2	3
Overall rating				
Poor	3	1	0	1
Fair	4	1	1	1
Good	14	2	0	1
Excellent	4	0	0	0
[$x^2(9)=6.79$, ns]				
Degree of rest				
Not rested	1	1	0	0
Somewhat unrested	5	1	0	1
Somewhat rested	15	2	1	2
Very rested	4	0	0	0
[$x^2(9)=4.88$, ns]				
Soundness of sleep				
Very unsound	0	1	0	1
Somewhat unsound	4	0	1	0
Somewhat sound	12	1	0	2
Very sound	9	2	0	0
[$x^2(9)=16.32$, ns]				
Total sleep cycle opportunities				
0	1	1	0	0
1	7	1	1	1
2	8	1	0	1
3	8	1	0	1
4	2	0	0	0
5	1	0	0	0
[$x^2(15)=6.48$, ns)				
Sleep cycle opportunities: First third				
0	8	1	1	0
1	17	3	0	3
2	2	0	0	0
[$x^2(6)=4.54$, ns]				

(table continues)

Sleep Parameter	Number of Doses 0	1	2	3
Sleep cycle opportunities:				
Last third				
0	10	2	0	1
1	10	2	1	2
2	7	0	0	0
[$x^2(6)=4.06$, ns]				

Table 13

First Postpartum Day Sedative-Hypnotic Medication Use and First Night Sleep

Sleep Parameter	Number of Doses 0	1
Overall rating		
Poor	4	1
Fair	7	0
Good	16	1
Excellent	4	0
[$x^2(3)=2.42$, ns]		
Degree of rest		
Not rested	1	1
Somewhat unrested	7	0
Somewhat rested	19	1
Very rested	4	0
[$x^2(3)=7.53$, ns]		
Soundness of sleep		
Very unsound	2	0
Somewhat unsound	5	0
Somewhat sound	15	0
Very sound	9	2
[$x^2(3)=4.26$, ns]		
Total sleep cycle opportunities		
0	2	0
1	8	2
2	10	0
3	10	0
4	2	0
5	1	0
[$x^2(5)=5.30$, ns]		
Sleep cycle opportunities		
First third		
0	9	1
1	22	1
2	2	0
[$x^2(2)=0.54$, ns]		

(table continues)

Sleep Parameter	Number of Doses 0	1
Sleep cycle opportunities:		
Last third		
0	12	1
1	14	1
2	7	0
[$x^2(2)=0.54$, ns]		

Table 14

First Postpartum Day Central Acting Analgesia and Second Night Sleep

Sleep Parameter	Number of Doses 0	1	2	3-6
Overall rating				
Poor	2	1	0	1
Fair	1	1	0	2
Good	5	4	0	3
Excellent	1	3	2	0
[$x^2(9)=11.07$, ns]				
Degree of rest				
Not rested	0	1	0	0
Somewhat unrested	0	0	0	3
Somewhat rested	8	5	1	3
Very rested	1	3	1	0
[$x^2(9)=16.45$, ns]				
Soundness of sleep				
Very unsound	0	1	0	1
Somewhat unsound	1	1	0	2
Somewhat sound	1	2	0	1
Very sound	7	5	2	2
[$x^2(9)=5.78$, ns]				
Total sleep cycle opportunities				
0	2	0	0	0
1	3	2	0	2
2	2	4	1	1
3	1	3	1	3
4	1	0	0	0
[$x^2(12)=10.01$, ns]				
Sleep cycle opportunities: First third				
0	5	3	1	2
1	2	5	1	4
2	2	1	0	0
[$x^2(6)=4.34$, ns]				

(table continues)

Sleep Parameter	Number of Doses 0	1	2	3-6
Sleep cycle opportunities:				
Last third				
0	6	2	0	2
1	2	6	0	3
2	1	1	2	1
[$x^2(6)=13.76$, $p < .05$]				

sleep cycle opportunities during the first third of the second night and the second night as a whole (Table 14).

In examining the relationships between the number of doses of peripheral analgesia and sedative-hypnotic medications taken on the first day and the overall rating of sleep, the degree of rest, soundness of sleep, and sleep cycle opportunities measured on the second postpartum night, no significant associations existed (Tables 15-16).

Examining the associations between the numbers of doses of central and peripheral acting analgesia received on the second postpartum day and the overall rating of sleep, the degree of rest, soundness of sleep, and sleep cycle opportunities on the second night, no significant relationships were discovered (Tables 17-18). No sedative-hypnotic medications were administered on the second postpartum day.

Table 15

First Postpartum Day Peripheral Acting Analgesia and Second Night Sleep

Sleep Parameter	Number of Doses 0	1	2	3
Overall rating				
Poor	1	2	0	1
Fair	2	1	0	1
Good	10	0	1	1
Excellent	5	1	0	0
[$x^2(9)=10.29$, ns]				
Degree of rest				
Not rested	0	0	0	1
Somewhat unrested	1	2	0	0
Somewhat rested	13	1	1	2
Very rested	4	1	0	0
[$x^2(9)=16.05$, ns]				
Soundness of sleep				
Very unsound	1	0	0	1
Somewhat unsound	3	0	0	1
Somewhat sound	3	1	0	0
Very sound	11	3	1	1
[$x^2(9)=6.09$, ns]				
Total sleep cycle opportunities				
0	1	1	0	0
1	4	1	1	1
2	5	1	0	2
3	7	1	0	0
4	1	0	0	0
[$x^2(12)=7.92$, ns]				
Sleep cycle opportunities: First third				
0	7	3	0	1
1	8	1	1	2
2	3	0	0	0
[$x^2(6)=4.17$, ns]				

(table continues)

Sleep Parameter	Number of Doses 0	1	2	3
Sleep cycle opportunities:				
Last third				
0	6	2	1	1
1	7	2	0	2
2	5	0	0	0
[$x^2(6)=4.44$, ns]				

Table 16

First Postpartum Day Sedative-Hypnotic Medication Use and Second Night Sleep

Sleep Parameter	Number of Doses 0	1
Overall rating		
Poor	4	0
Fair	4	0
Good	10	2
Excellent	6	0
[$x^2(3)=2.53$, ns]		
Degree of rest		
Not rested	1	0
Somewhat unrested	3	0
Somewhat rested	15	2
Very rested	5	0
[$x^2(3)=1.15$, ns]		
Soundness of sleep		
Very unsound	2	0
Somewhat unsound	4	0
Somewhat sound	4	0
Very sound	14	2
[$x^2(3)=1.35$, ns]		
Total sleep cycle opportunities		
0	2	0
1	7	0
2	7	1
3	7	1
4	1	0
[$x^2(4)=1.35$, ns]		
Sleep cycle opportunities: First third		
0	10	1
1	12	0
2	2	1
[$x^2(2)=3.81$, ns]		

(table continues)

Sleep Parameter	Number of Doses 0	1
Sleep cycle opportunities:		
Last third		
0	9	1
1	10	1
2	5	0
[$x^2(2)=0.52$, ns]		

Table 17

Second Postpartum Day Central Acting Analgesia and Second Night Sleep

Sleep Parameter	Number of Doses 0	1	2	3-6
Overall rating				
Poor	2	1	1	0
Fair	3	0	0	1
Good	8	1	0	3
Excellent	4	2	0	0
[$x^2(9)=10.71$, ns]				
Degree of rest				
Not rested	0	1	0	0
Somewhat unrested	3	0	0	0
Somewhat rested	11	1	1	4
Very rested	3	2	0	0
[$x^2(9)=11.96$, ns]				
Soundness of sleep				
Very unsound	0	1	0	1
Somewhat unsound	2	1	0	1
Somewhat sound	4	0	0	0
Very sound	11	2	1	2
[$x^2(9)=7.84$, ns]				
Total sleep cycle opportunities				
0	1	0	1	0
1	5	1	0	1
2	4	2	0	2
3	6	1	0	1
4	1	0	0	0
[$x^2(12)=14.68$, ns]				
Sleep cycle opportunities: First third				
0	7	1	1	2
1	7	3	0	2
2	3	0	0	0
[$x^2(6)=4.01$, ns]				

(table continues)

Sleep Parameter	Number of Doses 0	1	2	3-6
Sleep cycle opportunities:				
Last third				
0	7	1	1	1
1	8	1	0	2
2	2	2	0	1
[$x^2(6)=4.97$, ns]				

Table 18

Second Postpartum Day Peripheral Acting Analgesia and Second Night Sleep

Sleep Parameter	Number of Doses 0	2
Overall rating		
Poor	4	0
Fair	4	0
Good	12	0
Excellent	5	1
[x^2(3)=3.47, ns]		
Degree of rest		
Not rested	1	0
Somewhat unrested	3	0
Somewhat rested	17	0
Very rested	4	1
[x^2(3)=4.37, ns]		
Soundness of sleep		
Very unsound	2	0
Somewhat unsound	4	0
Somewhat sound	4	0
Very sound	15	1
[x^2(3)=0.65, ns]		
Total sleep cycle opportunities		
0	2	0
1	7	0
2	7	1
3	8	0
4	1	0
[x^2(4)=2.34, ns]		
Sleep cycle opportunities: First third		
0	10	1
1	12	0
2	3	0
[x^2(2)=1.42, ns]		

(table continues)

Sleep Parameter	Number of Doses 0	Number of Doses 2
Sleep cycle opportunities:		
Last third		
0	10	0
1	10	1
2	5	0
[$x^2(2)=1.42$, ns]		

CHAPTER IV

DISCUSSION

The results of this study indicated several areas for further analysis and discussion. From the data regarding intrapartum analgesia and postpartum sleep, those subjects who had more opportunities for sleep on the first postpartum night were those who had taken no labor analgesia or had taken only a short acting analgesic. These results suggested that those subjects who experienced an insufficient amount of discomfort in labor to warrant the use of a central nervous system acting narcotic escaped the physiological effects of those medications on the first postpartum night's sleep. And for those subjects who received only the short acting narcotic, the results suggested that the effects of that medication did not produce the profound changes in sleep physiology associated with narcotic analgesics and so did not effect the sleep parameters measured on the first postpartum night. Use of analgesics continued throughout the postpartum period with other significant results.

The overall pattern of oral analgesic use during the postpartum study period was consistent for every analgesic administered. The use of these medications peaked on the first postpartum day and then tapered off by the second day. However, the use of other postpartal comfort measures, both pharmacologic and nonpharmacologic, was not indicated in the original study. Since the perinatal nurse had a wide variety of comfort promoting interventions available to the study's

participants, it was uncertain what influence these interventions had on further analgesic use. If the effects of these other comfort measures were substantial enough to result in the sharp drop in analgesic use after the first day, this study was unable to detect their effects. Viewing the interaction of postpartum medications and the sleep parameters provided further insight into the subjects' postpartum course.

From the postpartum medication administration patterns, no consistent relationships between the type of medication or the number of doses and the sleep parameters existed. Some isolated patterns, however, emerged. Perceptions of sleep on the first and second postpartum nights were not associated with either central or peripheral acting analgesic use. However, observations of sleep on the second postpartum night were associated with one or more doses of central acting analgesia taken on the first day. This result suggested that the interaction between sleep and medication use may have resulted from both the type of medication administered and the number of doses received by the subjects. And from the review of literature concerning the effects of narcotic analgesics on the physiological aspects of sleep, it was possible that central acting analgesics taken on the first day did have a long-term effect on the second night's sleep. Other factors, however, such as the amount of each medication dose, the timing of the dose in relation to sleep, and the use of nonpharmacologic comfort measures were not studied. As a result, their role in the association between first day central acting analgesia and second night sleep cycle opportunities was unknown. The

association between first day central acting analgesia and second night sleep cycle opportunities may have even occurred by chance, with the findings of this study not supporting the existing literature about analgesic effects on sleep.

No other relationships were found among the postpartum medications and the postpartum sleep parameters. It was possible that no relationships were found because none actually existed. Also, it was possible that the sample size was too small to detect associations between variables. A number of empty cells occurred in the chi-square analysis, resulting in the possibility of over or under estimating the effect between variables. Since the overall use of analgesia was low, it may have been impossible to detect significant associations during this study. So few doses of sedative-hypnotic medications were administered during the entire study period that it was also impossible to draw accurate conclusions about their relationships with the sleep parameters.

Implications for Nursing

The results of this study raised important issues surrounding the postpartum period and the perinatal nurse. With the current trend of shorter hospital stays after childbirth, the perinatal nurse has even less time than ever to assess, plan, and intervene with her clients. Since approximately one half of the medications the perinatal nurse administered to postpartum clients were comfort promoting analgesics, this contact could provide an added opportunity to assess the client's comfort and sleep status and to intervene not only with medication but

also with other comfort measures as well. Thus, this opportunity should not lightly be delegated to paraprofessional nursing personnel whose sole duty is medication administration. The need for an all registered nursing staff who are capable of providing a biopsychosocial approach to postpartum nursing care is clear. However, before the nurse intervenes, assessment of the client's perceptions of comfort and sleep in the postpartum period is essential.

Assessment of the client's perceptions is important before planning and implementing nursing interventions. If clients perceive the disrupted sleep patterns after birth as detrimental to their health, then nursing must be ready to assist these clients with interventions to improve the quality of their sleep. However, if the clients perceive the disruptions in postpartal sleep as normal and of no consequences, then nursing must focus its attention on further assessment of the client's sleep patterns. Whatever the outcome of nursing assessment, perinatal nurses must be aware of the bias they bring to each individual client.

As a practitioner, this author has noted that each nurse has a bias in regards to administering medications to postpartum clients. Nurses must be acutely aware of their own feelings regarding administering medications and how those feelings may influence, either advertently or inadvertently, each client's decision to accept or reject medication. So frequently new parents ask what effects medications taken by the mother have on the infants, especially if the infant is breast feeding. And, as professionals, nurses must provide

accurate information to their clients about both the benefits and the potential risks associated with medications. For those clients who choose medication, it is nursing's responsibility to insure a safe environment for both the mother and her newborn infant. And for the mother who decides against the use of medications, nursing must offer alternative methods for comfort and sleep enhancement. No matter which decision the client makes, it is nursing's responsibility to support that decision in a nonjudgmental fashion.

Methodological Problems

The use of secondary analysis for this study presented methodological problems that interfered with the analysis and limited interpretation of results. At the onset of the study, a problem existed with an inconsistent definition of the day following birth. Each subject delivered at a different time of the day, making the length of time from birth to the start of the observational and self-report segments of the study variable for each subject. Subjects may have entered the study fully rested; others may have entered unrested. The potential effects of these differences were not considered in the primary study or this secondary analysis. Even though this inconsistent definition existed throughout the sample, the problem of missing data further complicated this study's results.

Data were missing from the descriptions of the sample, intrapartum analgesia and anesthesia use, postpartum medication use, and the self-reported descriptions and observations of sleep. The direct observations of sleep were incomplete for nine of the subjects

on the second postpartum night because they were discharged early from the hospital before the completion of the study. Early discharge may have biased the second postpartum night's data because those subjects who remained in the hospital may have been different from those who were discharged. Thus, the accuracy of the conclusions about the effects of medications on the sleep parameters should be questioned. Along with this missing data, the actual computer coding of the data presented a problem.

Since this author did not place the original data into the computer, the possibility of errors during the coding phase of the primary study existed. By the very nature of secondary analysis, the original data were unavailable to this author. And so, a check for accuracy of coding could not be performed. Potential errors in coding may have influenced any or all of the results of this secondary analysis.

Areas for Further Study

With sleep and medication patterns for one sample of women during their first two postpartum days described by this study, areas for further research have surfaced. Further study focusing specifically on medication use in the postpartum period would answer the research questions asked here more fully. Studying the contribution of other comfort promoting interventions in the postpartum period would also add more information to the picture of sleep in the postpartum period.

Traditionally, postpartum nursing care includes a wide range of both pharmacologic and nonpharmacologic interventions that are used to

ease discomfort and promote sleep. However, whether or not each intervention actually contributes to sleep enhancement has never been fully established through research. Through careful study of these alternative interventions, perinatal nurses and their clients can make the best and the most timely decisions regarding sleep enhancement for both the hospitalized stay and the remainder of the postpartum period.

Medication use throughout the remainder of the four to six week postpartum period has not been fully documented. Since the majority of the postpartum period is spent outside the hospital environment where over-the-counter medications for sleep and discomfort are readily available, exactly what medicine postpartum women use at home is unknown. Descriptions of medication use patterns would add more information to the picture of sleep in the postpartum period.

The last issue implicated by this study for further research concerns the broader issue of postpartum women and the family. Today, the need for women to return to work soon after birth is often paramount for the economic survival of their families. And so, along with the physiological and psychological demands of postpartum recovery come the responsibilities of employment, childcare, and potentially other household responsibilities. The need to study the sleep patterns of these working postpartum women is important to provide the most complete picture of sleep during the postpartum period.

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APPENDIX A

SUBJECT DATA: RECORD REVIEW

Age (at last birthday):
Gravida:_______ Parity:_______
Method of feeding:
_______Breast feeding
_______Bottle feeding
_______Combination (describe)

Infant weight:_______gm
Gestational age of infant:_______weeks

Weight
Nonpregnant:_______gm
1st prenatal visit:_______gm
Total weight gain:_______gm

Blood Pressure
Nonpregnant:_______
Minimum:_______
Maximum:_______
On admission to labor:_______
On admission to postpartum unit:_______
1st postpartum day:_______
2nd postpartum day:_______

Temperature
On admission to labor:_______
On admission to postpartum unit:_______
1st postpartum day:_______
2nd postpartum day:_______

Antepartum risk score*:_______
Intrapartum risk score*:_______
*Derived from Regional Perinatal Program records

Labor characteristics
Type of delivery:
_______Vaginal, no forceps
_______Vaginal, forceps
_______Cesarean, trial labor
_______Cesarean, no trial labor

Onset of labor (date, time):____________________________
Delivery of infant (date, time):________________________
Duration of 1st stage:______min.
Duration of 2nd stage:______min.
Duration of 3rd stage:______min.
Total duration of labor:______min.
Duration of ruptured membranes:______min.
Blood loss total:______cc.

Medications used

Labor

Total amount of analgesia:

Duration of anesthesia:______hours

Type of anesthesia:

______Local
______Regional
______General

Postpartum

Day	Type	Amount	Time
Delivery			
PP1			
PP2			
PP3			

APPENDIX B

MORNING SLEEP ASSESSMENT INTERVIEW

Postpartum Sleep Assessment (to be asked following each night of sleep observation)

1. What time did you go to bed last evening?

2. How long did it take you to go to sleep?

3. After you went to sleep, how often did you awaken during the night? What caused you to awaken?

4. After each awakening, how long did it take you to return to sleep?

5. What time did you wake up this morning? What caused you to awaken?

6. Describe how you feel after last night's sleep.

7. Did you take any medication last night to help you sleep? If so, what?

8. Did you do anything else to help you sleep last evening? If so, what?

9. How would you rate your sleep of last night?
   a. excellent
   b. good
   c. fair
   d. poor

10. How rested do you feel this morning?
    a. very rested
    b. somewhat rested
    c. somewhat unrested
    d. not rested at all

11. How soundly did you sleep last night?
    a. very soundly
    b. somewhat soundly
    c. somewhat unsoundly
    d. very unsoundly

12. Is there anything else you believe is important for me to know about last night's sleep?

APPENDIX C

SLEEP OBSERVATION GUIDE

OBSERVATIONS	TIME
Conclusion re: Sleep (y/n)	
Respiratory Rate (actual)	
Position	
Speech	
Eyes	
Movement	
Patient Activity	
Room Temperature	
Lights	
Noise	
Environmental Activity	
vital signs	

blood pressure
fundus check ice applied
baby present state of baby
medication given
other roommate activity activity outside room

Coding System-Sleep Observation

Position

D	Dorsal	LL	Left lateral
V	Ventral	S	Sitting
RL	Right lateral		Up/NA

Speech

T	Talking
N	Not talking
I	Inappropriate

Movement-type

R	Random
P	Purposeful
N	None

Eyes

O	Open
C	Closed
S	Slit

Activity

W	Walk	O	Other
BR	Bathroom	TV	Watching television
F	Feed baby	K	Rock baby
E	Eat or drink	N	None
R	Reading		

Temperature

H	Hot
C	Cold
N	Neutral

Light

H	High
L	Low
N	None

Noise

H	High
L	Low
N	None

Baby's State

S	Sleeping
QW	Quiet awake
C	Crying
F	Feeding